NASA Grant Accomplishments at Vanderbilt:

Refereed science journal papers:

TOROIDAL ION DISTRIBUTIONS OBSERVED AT HIGH ALTITUDES EQUATORWARD OF THE CUSP, *Geophysical Research Letters*, February 15, 2000.
M.M Huddleston, C.J. Pollock, M.P. Wuest, J.S. Pickett, T.E. Moore, W.K. Peterson

MAGNETOSPHERIC RESPONSE TO THE ARRIVAL OF THE SHOCK WAVE IN FRONT OF THE MAGNETIC CLOUD OF JANUARY 10, 1997, *Advances in Space Research*, © 2000 Cospar.
M. Wuest, M.M. Huddleston, J.L. Burch, D.L. Dempsey, P.D. Craven, M.O. Chandler, J.F. Spann, W.K. Peterson, H.L. Collin, O.W. Lennartsson

THE ADEQUACY OF THE IONOSPHERIC SOURCE IN SUPPLYING MAGNETOSPHERIC PLASMA, Journal of Atmospheric and Solar Terrestrial Physics, 2000p. 421.
C.R. Chappell, B.L. Giles, T.E. Moore, D. C. Delcourt, P.D. Craven, M. O. Chandler

Posters/talks/abstracts:

IONOSPERIC OUTFLOW AND ENERGIZATION IN THE DAYSIDE MAGNETOSPHERE AND POLAR CAP**,** 2000 Spring AGU Meeting, Washington D.C.
C.R. Chappell, M.M. Huddleston, B.L. Giles, T.E. Moore

HIGH ALTITUDE TOROIDAL ION DISTRIBUTION FUNCTIONS OBSERVED NEAR THE EQUATORWARD CUSP BOUNDARY**,** 1999 ISTP/Polar Team Meeting, Greenbelt, MD.
M.M Huddleston, C.J. Pollock, M.P. Wuest, J.S. Pickett, T.E. Moore, W.K. Peterson

Ongoing research activities:

- Local installation and management of software (developed by MSFC) to process TIDE/PSI data.
- Statistical analysis of TIDE data during all times of active PSI operation.
- Local installation and management of software (developed by D. Delcourt) to model ion trajectories in the magnetosphere.
- Initial mapping of outflowing dayside polar wind ions to various magnetospheric locations.
- Comparison of TIDE/PSI Polar wind observations with model trajectory results and previous DE/RIMS and Akebono data.
- Statistical pitch angle distribution survey of low energy outflowing ionospheric ions from the mass-resolved TIDE data set.
- Collection of data from other ISTP spacecraft in order to analyze the process of low energy ion energization in the plasma sheet.

During the fall semester of 2000, Matthew Huddleston passed the physics qualifying examinations at Vanderbilt University and became an official Ph.D. candidate in the Department of Physics and Astronomy.

Future Directions

- Submit an abstract to present the results of our low energy ion pitch angle distribution survey along with the most current model trajectory results at the 2001 Fall AGU.
- Submit an abstract to show the dynamics of ionospheric plasma as it enters the plasma sheet at the 2001 Fall AGU.
- Submit a paper to JGR on the results of our statistical pitch angle distribution survey of low energy outflowing ionospheric ions.
- Submit a paper to JGR which maps out the ultimate destination of all outflowing polar wind ions using model trajectory results and the TIDE/PSI data set, as well as other relevant instrument data sets. Explain high altitude observations in terms of model results and low altitude input parameters.
- Estimate the total contribution of ionospheric ions to the plasma sheet. Estimate the overall degree to which plasma throughout the magnetosphere is supplied by the earth's ionosphere.